UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,642	10/29/2003	Naoya Sashida	032061	5390

38834 7590 03/10/2006

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER	
PHAM, THANHHA S	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,642	SASHIDA ET AL.	
	Examiner	Art Unit	
	Thanhha Pham	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *12-14 and 16-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 7-11* is/are rejected.

7)☐ Claim(s) *5, 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *03/05/2006* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant Amendment dated 11/14/2005.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2 are 7-11 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sekiguchi [US 2002/0024142].

► With respect to claims 1-2 and 7-9, Sekiguchi (figs 5's-6's and text [0001]-[0161]) discloses the claimed manufacturing method of a semiconductor device comprising steps of:

forming an insulating film (501, fig 5A, text [0133]) over a semiconductor substrate (500) ***[claim 1]***;

exciting a plasma of a gas having a molecular structure in which hydrogen and nitrogen are bonded and irradiating the plasma onto the insulating film to form nitrogen-hydrogen (N-H) boned on a surface thereof (Sekiguchi uses ammonia plasma for treating the insulating, since ammonia has N-H bond, N-H bond will be inherenty

formed on the surface of the insulating film), wherein the gas is an ammonia gas (text [0158]) ***[claims 1 and 2];***

forming a self-orientation layer made of substance having a self-orientation characteristic (503, copper, fig 5A, text [0133], [0156]-[0157]) on the insulating film, wherein the self-orientation layer is formed of any one of titanium, aluminum, silicon, copper, tantalum, tantalum nitride, iridium, iridium oxide, and platinum, ***[claims 1 and 7]***; and

forming a first conductive film (504, copper, fig 5A, text [0135], [0156]-[0157]) made of conductive substance having the self-orientation characteristic on the self-orientation layer, wherein the first conductive film is formed of any one of titanium, aluminum, silicon, copper, tantalum, tantalum nitride, iridium, iridium oxide, and platinum, wherein the first conductive film is formed by any one of a sputter method, a plasma CVD method, an MOCVD method, and a plating method ***[claims 1, 8 and 9]*** .

► With respect to claims 10-11, Sekiguchi (figs 5B-5C) shows forming a conductive pattern by patterning the first conductive film and the self-orientation layer wherein the conductive pattern is any one of an electrode and a wiring.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi [US 2002/0024142] in view of Abe [US 2002/0013057].

Sekiguchi substantially discloses the claimed method including after the plasma is irradiated into the insulating film, the self-orientation layer (503, copper) is formed on the insulating film. Sekiguchi does not specifically mention forming said self-orientation layer while maintain a state that the insulating film is put in a vacuum atmosphere wherein a pressure of vacuum atmosphere is set to $1x10^{-3}$ torr or less. a vacuum atmosphere with the pressure being set to $1x10^{-3}$ torr or less

However, forming the self-orientation layer in is known in the art. See Abe (text [0019]-[0020]) as an evidence that shows forming the self-orientation layer in the vacuum atmosphere with the pressure being set to $1x10^{-3}$ torr or less.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process Sekiguchi by forming the self-orientation layer in vacuum atmosphere as being claimed to prevent contamination to the semiconductor device when forming said film.

Allowable Subject Matter

3. Claim 5 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following are statements of reasons for the indication of allowable subject matter:

► Recorded Prior Art fails to disclose or suggest the combination of the process steps as recited in the base claim 1 including: after irradiating the plasma onto the insulating film, dehydrating the insulating film by coating alcohol thereon; and after dehydrating the insulating film, forming a self-orientation layer made of a substance having a self-orientation characteristic on the insulating film as characteristics 5.

► Recorded Prior Art fails to disclose or suggest the combination of the process steps as recited in the base claim 1 including forming a ferroelectric film on the first conductive film; forming a second conductive film on the ferroelectric film; forming a capacitor upper electrode by patterning the second conductive film; patterning the ferroelectric film to leave at least under the capacitor upper electrode; and forming the capacitor lower electrode at least below the capacitor upper electrode by patterning the first conductive film and the self-orientation layer as characteristics in claim 15.

Response to Arguments

5. Applicant's arguments filed 11/14/2005 have been fully considered but they are not persuasive.

With respect to Applicant's argument on pages 8-9, Applicant argues that Sekiguchi teaches directed to plasma processing intended to "nitride". Sekiguchi does not teach irradiating the plasma onto the insulating film to form N-H bond on a surface thereof. Applicant's argument is not persuasive since Sekiguchi uses ammonia plasma

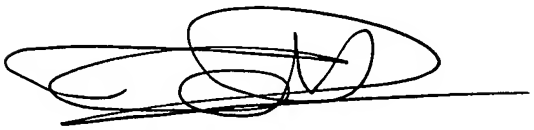
(material with N-H bond) for nitridizing the insulating film (the same as Applicant's invention that uses ammonia plasma to form N-H bond on the surface of the insulating film -- also nitridizes the surface of the insulating film). Claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. In re Best, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thanhha Pham
Patent Examiner
Patent Examining Group 2800